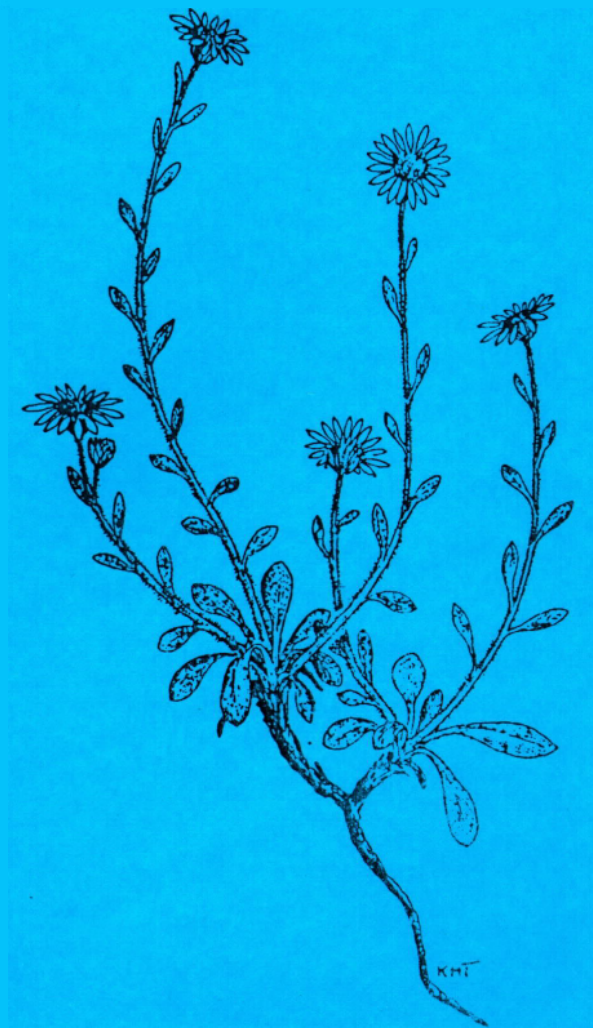


MAGUIRE

DAISY

(Erigeron maguirei)



RECOVERY PLAN

U.S. Fish and Wildlife Service

Region 6

1995



MAGUIRE DAISY

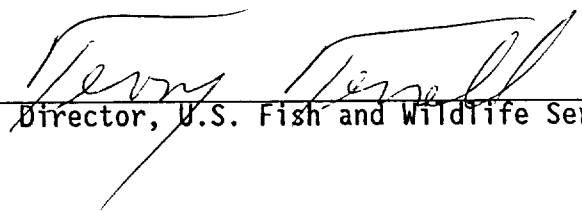
ERIGERON MAGUIREI

RECOVERY PLAN

Prepared by

Region 6, U.S. Fish and Wildlife Service

Approved:
DEPUTY


Regional Director, U.S. Fish and Wildlife Service

Date:

AUG 15 1995

DISCLAIMER

Recovery plans delineate reasonable actions which are believed to be required to recover and/or protect the species. Plans are prepared by the U.S. Fish and Wildlife Service, sometimes with the assistance of recovery teams, contractors, State agencies, and others. Objectives will only be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints. Recovery plans do not necessarily represent the views or the official positions or approvals of any individuals or agencies involved in the plan formulation, other than the U.S. Fish and Wildlife Service. They represent the official position of the U.S. Fish and Wildlife Service only after they have been signed by the Regional Director or Director as approved. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery tasks.

LITERATURE CITATIONS

Literature Citations should read as follows:

U.S. Fish and Wildlife Service. 1995. Maguire daisy (Erigeron maguirei) recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado. 13 pp.

Additional copies may be purchased from:

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Cover illustration by Kaye H. Thorne, Brigham Young University Herbarium, Provo, Utah.

EXECUTIVE SUMMARY

Current Status: The Maguire daisy is currently known from a series of small populations within the San Rafael Swell in Emery County, Utah, and the Waterpocket Fold of Wayne County, Utah. Currently 33 locations representing 7 separate populations are known, with a total population of approximately 5,000 individuals.

Recovery Objective: Erigeron maguirei var. maguirei is currently listed as endangered. As a consequence of recent taxonomic research of the phylogenetic relationships of the two varieties of Erigeron maguirei, var. maguirei and var. harrisonii, it has been determined that those two varieties are synonymous with each other. The Service has therefore determined that due to the larger population of the Maguire daisy, as a result of combining E. m. harrisonii (previously a category 2 species) with E. m. maguirei, the Maguire daisy should be reclassified from endangered to threatened (see proposed rule published in Federal Register 59:46219 on September 7, 1994). If the inherent vulnerability of the species is decreased to the point that localized threats will not jeopardize the species, delisting of Maguire daisy would be possible. Recovery can be accomplished either by discovery of significant additional populations and/or through long-term land use designations which would provide for the protection and maintenance of species and its habitat and the maintenance of the species total population at viable population levels.

Delisting Criteria:

1. Locate and/or establish additional populations. Maintain 20 populations which have been demonstrated to be above minimum viable population levels. Until minimum viable population levels are determined, it is assumed that the minimum viable population level will be about 500 individuals.
2. Establish formal land management designations for these populations which provide long term, undisturbed habitat for Maguire daisy.
3. Ensure that Maguire daisy and its habitat is protected from loss of individuals and environmental degradation.

Actions Needed:

1. Control activities which affect the habitat of Maguire daisy through section 7 of the Endangered Species Act and other relevant laws and regulations.
2. Inventory suitable habitat for Maguire daisy and determine with a reasonable degree of accuracy the population and distribution of the species.
3. Establish and conduct at least six minimum viable population studies on at least six different populations of Maguire daisy.
4. Document the presence of or, if necessary, establish formal land management designations which would provide for long-term protection for Maguire daisy and its habitat.
5. Develop public awareness, appreciation and support for the conservation of Maguire daisy.

Date of Recovery: 2005

Total Cost of Recovery: unknown

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I. INTRODUCTION

The Maguire daisy (*Erigeron maguirei* var. *maguirei*) was listed as an endangered species under the authority of the Endangered Species Act, as amended, on September 5, 1985 (50 FR 36089). As a consequence of recent taxonomic research of the phylogenetic relationships of the two varieties of *Erigeron maguirei*, var. *maguirei* and var. *harrisonii*, it has been determined that those two varieties are synonymous with each other (Van Buren 1993). The U.S. Fish and Wildlife Service has therefore determined that due to the larger population of the Maguire daisy, as a result of combining *E. m. harrisonii* (previously a category 2 species) with *E. m. maguirei*, the Maguire daisy should be reclassified from endangered to threatened. The species (*Erigeron maguirei*) was proposed for reclassification as threatened on September 7, 1994 (59 FR 46219). This species has been given a recovery priority of 8 which indicates it is a full species with a moderate degree of threat and a high recovery potential.

The Maguire daisy draft recovery plan was sent to four botanists, with specific knowledge of the species and its ecosystem, for peer review. Two reviewers responded with additional information concerning the species biology and distributional status. Their comments were incorporated into this final plan.

This recovery plan was prepared in-house by the Service with technical input from biologists from the Moab District of the Bureau of Land Management, Capitol Reef National Park, and the Utah Natural Heritage Program. All known populations of this species are on Federal and State managed lands. No private lands or private individuals will be directly affected by the recovery plan. The Service will involve all interested parties in the recovery plan implementation process through the development of a participation plan as the resources become available for the initiation of the various recovery plan tasks. This recovery plan, with its implementation schedule, will serve as the initial participation plan for this species.

A. DESCRIPTION

The Maguire daisy is a perennial, herbaceous plant in the composite family (Asteraceae). The stems are decumbent to sprawling or erect 7 to 18 cm (3 to 7 inches) tall. The basal leaves are spatulate or broadly oblanceolate in outline, 2 to 5 cm (0.8 to 2 inches) long and 0.6 to 0.9 cm (0.25 to 0.35 inches) wide. The cauline leaves are sessile or short-petiolate, alternately arranged on the stem and are well developed, only slightly reduced upwards, oblanceolate becoming lanceolate or narrowly elliptic upwards. Both the leaves and stems are covered with a copious spreading hirsute pubescence. One to three flower heads are borne at the end of each stem. The floral disc is 8 to 10 mm (0.3 to 0.4 inches) wide; the involucre is 5 to 6.5 mm (0.2 to 0.25 inches) high. Each floral head has 15 to 20 ligules (ray flowers) white or pinkish white color about 6 to 8 mm (0.25 to 0.3 inches) long and 1.5 to 2 mm (0.05 to 0.08 inches) wide. The disk flowers are orange, about 3.5 to 3.8 mm (0.14 to 0.15 inches) long. The seeds are 2-nerved achenes (Cronquist 1947; Cronquist et al. 1994, Welsh 1983a, 1983b; Welsh et al. 1993).

The Maguire daisy is a member of a genus of about 200 species as currently recognized in botanical literature (Cronquist 1947, Cronquist et al. 1994). Most species are from the western hemisphere with western North America being the center of the genus' distribution.

B. DISTRIBUTION AND POPULATION BIOLOGY

The Maguire daisy is currently known from 33 locations representing 7 separate populations. Four populations with a total of 21 locations are located in the center of the San Rafael Swell in Emery County, Utah (Harris 1980, Kass 1990a, 1990b) (Figure 1). One San Rafael Swell population with eight locations is found in Coal Wash within the Sid's Mountain Wilderness Study Area, the second population with seven locations is found on Secret Mesa, the third population with five locations is found at Link Flats (Kass 1990a, 1990b), and the fourth population with one location is located in Calf Canyon. Three populations with a total of 12 locations are located in the Waterpocket Fold within Capitol Reef National Park (Heil 1987, Heil et al. 1993) (Figure 2). One Waterpocket Fold population with five locations is found at Deep Creek, the second population with six locations is found in Capitol Reef, and the third population with one location is found in the Fremont River Gorge. Being a recently discovered species, Maguire daisy's historical distribution is the same as its current known distribution. The total known population is estimated at 5,000 individuals. The majority of the populations of Maguire daisy are located on Federal lands managed by the Bureau of Land Management and the National Park Service with the remainder on isolated sections of State of Utah lands.

The Maguire daisy grows within the lower limits of pinyon-juniper vegetation zone but attains its optimal growth in the mountain shrub zone. The daisy prefers cool, shaded mesic wash bottoms and alcoves and drier partially shaded slopes of eroded sandstone cliffs with north to east exposures and slopes less than 25percent (Kass 1990a, 1990b). Maguire daisy reproduction is sexual. Flowering occurs from May to June and fruiting occurs from June to July. Pollinators of the species are not known. The factors which govern the distribution of Maguire daisy are not well known, nor are the long-term population dynamics.

C. HABITAT AND LIMITING FACTORS

The habitat of the Maguire daisy is characterized by exposed sandstone mesas and steep, narrow canyons cut in sandstones of the Navajo Formation. These cross-bedded sandstones erode into fractures which become deposition zones for soil and organic matter. These deposition zones collect runoff from the surrounding bare slickrock and provide moist shaded micro-sites for establishment and growth of Maguire daisy seedlings. It is among these sites that the daisy attains its highest densities. The Maguire daisy also grows in the canyon bottom washes. These populations apparently are established from seeds dispersed by wind or overland flow from source populations on the mesa tops. These canyon populations are generally small consisting of 1 to 10 individuals (Kass 1990a).

SAN RAFAEL SWELL
POPULATIONS OF ERIGERON MAGUIREI

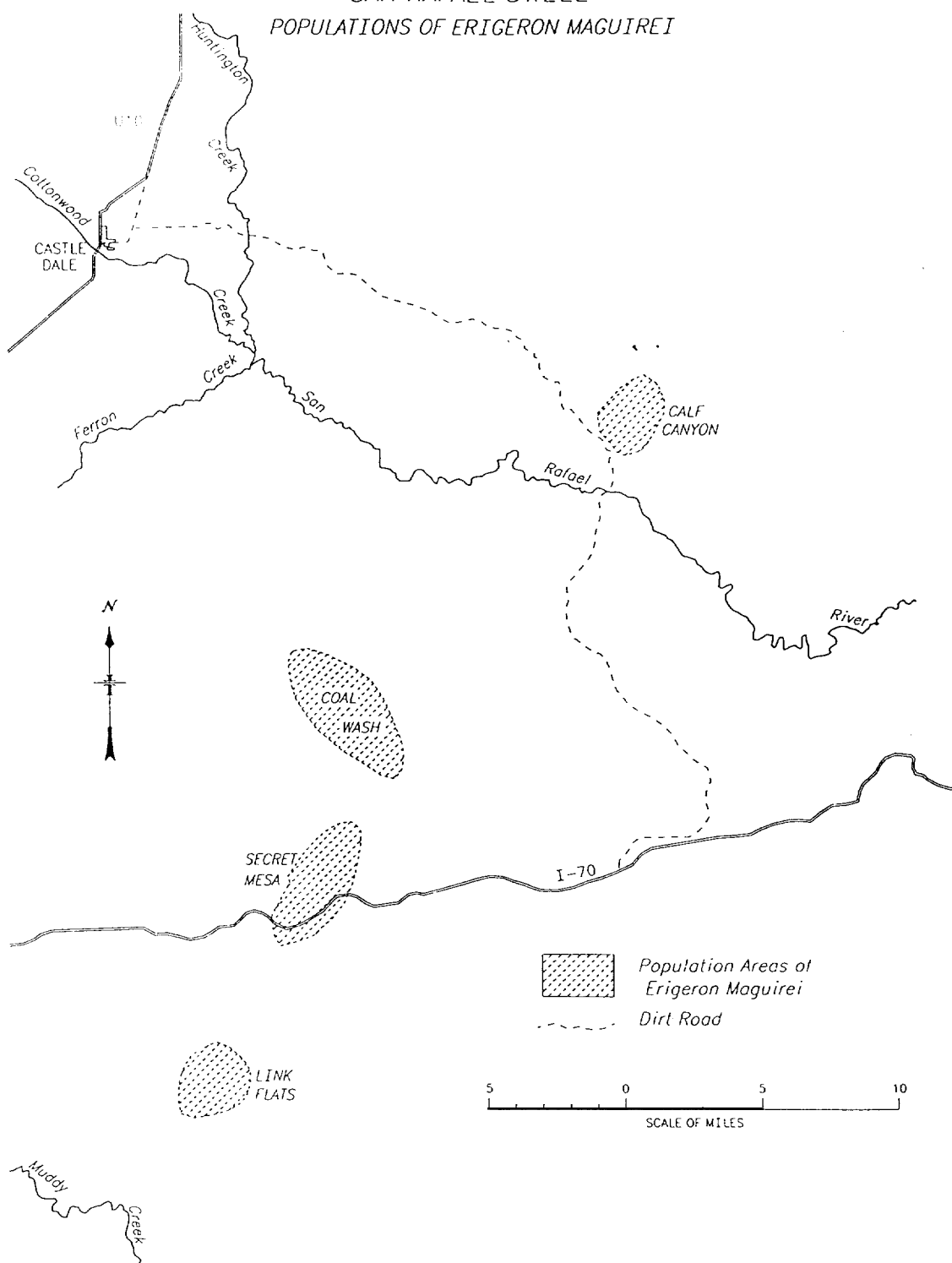


Figure 1. Distribution of Maguire daisy populations in San Rafael Swell, Emery County, Utah.

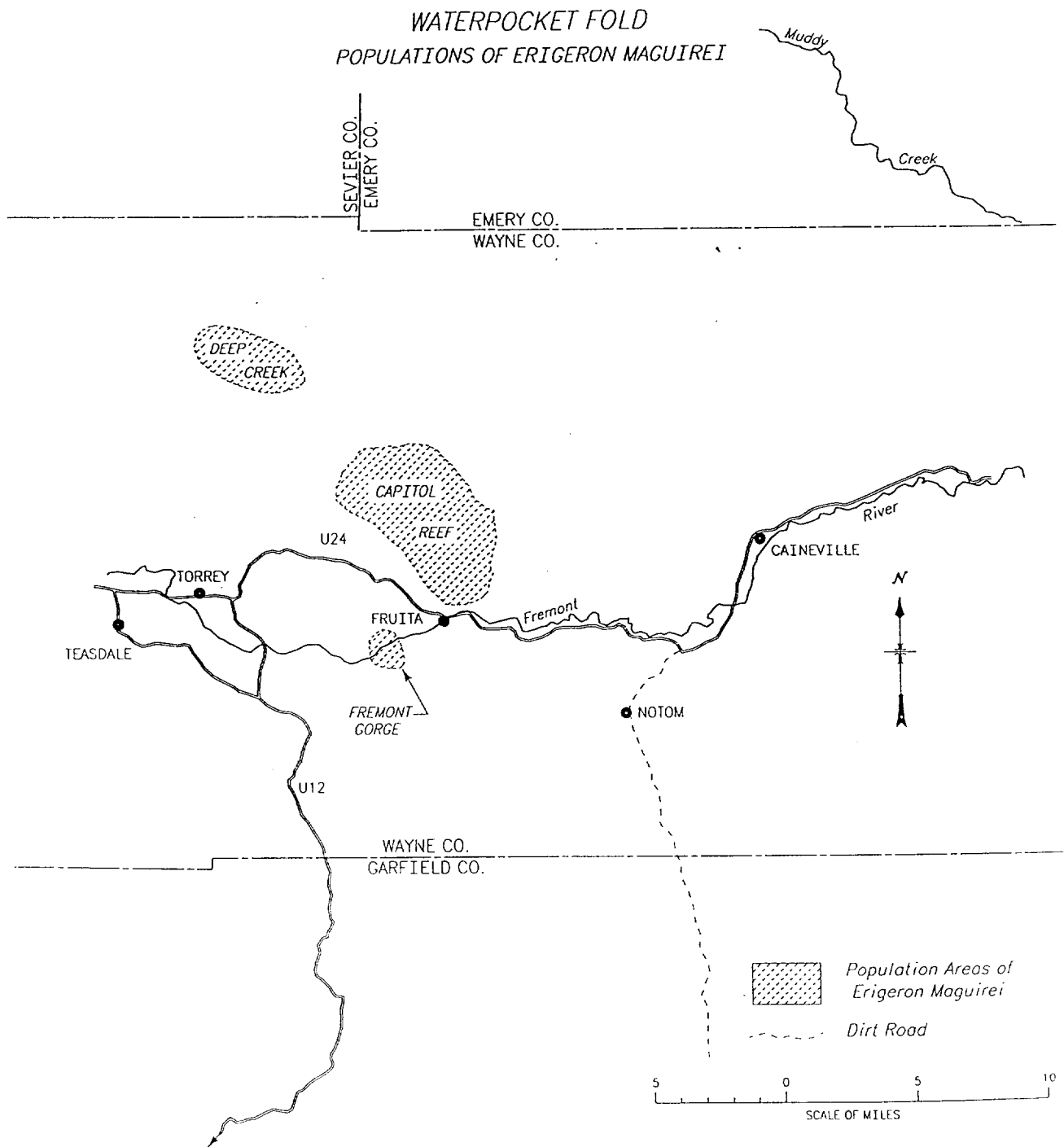


Figure 2. Distribution of Maguire daisy populations in Waterpocket Fold within Capitol Reef National Park, Utah.

D. THREATS

Realized and potential threats to Maguire daisy stem primarily from mineral and energy exploration and development, off-road use, and livestock trampling. The majority of the Maguire daisy locations are relatively secure from direct impacts. Trampling from off-road vehicles and livestock is a localized threat in some areas. The demographic stability of the various populations of Maguire daisy is not known. Some of the smaller populations may be at population levels too small to ensure their long-term survival. The effect of natural factors, such as disease, parasitism, grazing by native species, natural erosion, and vegetative competition on the viability of the species population is not known.

II. RECOVERY

A. OBJECTIVE AND CRITERIA

The primary objective of this recovery plan is to maintain viable populations of the Maguire daisy throughout the current range of the species and to identify those tasks necessary to fully recover the species. The listing of the Maguire daisy as threatened provides the recognition and protection necessary to ensure the species survival in the foreseeable future. Recovery can be accomplished either by discovery of significant additional populations or through long term land use designations which would provide for the protection of the daisy's habitat and maintenance of the species total population at viable population levels.

Delisting Criteria:

1. Locate and/or establish additional populations. Maintain 20 populations which have been demonstrated to be above minimum viable population levels. Until minimum viable population levels are determined, it is assumed that the minimum viable population level will be about 500 individuals.
2. Establish formal land management designations for these populations which provide long term, undisturbed habitat for Maguire daisy.
3. Ensure that Maguire daisy and its habitat is protected from loss of individuals and environmental degradation.

The above objective and criteria are subject to change as more information becomes available. The estimated date for recovery completion is 2005.

B. STEPDOWN OUTLINE FOR RECOVERY TASKS ADDRESSING THREATS

- 1. Control activities which affect the habitat of the Maguire daisy through Section 7 of the Endangered Species Act and other relevant laws and regulations.**
 - 1.1 Control mineral development activities.
 - 1.2 Control off-road vehicle use and recreational impacts.
 - 1.3 Control road building and maintenance.
 - 1.4 Control activities associated with livestock management.
- 2. Inventory suitable habitat for the Maguire daisy and determine with a reasonable degree of accuracy its population and distribution.**
- 3. Conduct research on the biology of the Maguire daisy.**
 - 3.1 Determine the biological and ecological factors controlling the viability of the Maguire daisy.
 - 3.2 Establish and conduct minimum viable population studies on at least six Maguire daisy populations.
 - 3.3 Determine the horticultural requirements and establish botanical garden populations of the Maguire daisy.
- 4. Evaluate the need for the introduction of supplemental populations into suitable habitat.**
- 5. Establish formal land management designations to provide for long-term protection of Maguire daisy habitat.**
- 6. Develop public awareness, appreciation and support for the conservation of the Maguire daisy.**

C. NARRATIVE FOR RECOVERY TASKS ADDRESSING THREATS

- 1. Control activities which affect the habitat of the Maguire daisy through section 7 of the Endangered Species Act and other relevant laws and regulations.**

Most of the habitat of the Maguire daisy occurs on federally managed public land under the jurisdiction of the Bureau of Land Management and the National Park Service. All Federal activities including mining, oil and gas field development, grazing, highway construction, etc., will need to be reviewed by the Service through consultation under section 7 of the Endangered Species Act in order to avoid or minimize impacts on the Maguire daisy and its habitat. The location and distribution of Maguire daisy populations are small and isolated enough that virtually all activities can be designed to avoid impacts to the species and its habitat.

- 1.1 Control mineral development activities. Potential mineral development threats may arise with the exploration for, and development of, uranium and gypsum ore deposits within the range of the species. The Bureau of Land Management, as part of their right-of-way and drilling permitting programs, requires an on-the-ground examination of all phases of mineral and oil and gas development which could impact the Maguire daisy or other listed threatened or endangered species. It also requires that mineral development activities avoid individual threatened and endangered plants.
- 1.2 Control off-road vehicle use and recreational impacts. At present, off-road vehicle use on the habitat of the Maguire daisy is light. However, with possible human population increases in the region and with increasing popularity and availability of improved off-road vehicles, off-road vehicle use is expected to increase. This could result in increased damage to the habitat of Maguire daisy. The Bureau of Land Management and National Park Service should develop plans which prohibit off-road vehicle use on Maguire daisy habitat.
- 1.3 Control road building and maintenance. Most roads in the vicinity of known populations of the Maguire daisy are rough, narrow unimproved trails. Interstate Highway 70 goes through the middle of the population of the San Rafael Swell. It is assumed that a portion of the population was destroyed due to road construction activities. Future road improvement and construction may further impact additional populations of this species. The Bureau of Land Management and Federal Highway Administration will ensure that the actions they conduct, permit, or fund in the habitat of the Maguire daisy do not affect this species.
- 1.4 Control activities associated with livestock management. The Maguire daisy was listed in part because of the species vulnerability to livestock over-grazing and trampling. Moderate to heavy domestic livestock grazing and trailing has been observed to cause physical damage to Maguire daisy plants through trampling. The Bureau of Land Management and National Park Service must protect the species from livestock grazing and further ensure that activities associated with livestock management do not adversely impact the species or its habitat.

2. Inventory suitable habitat for the Maguire daisy and determine with a reasonable degree of accuracy its population and distribution.

Thoroughly inventory and identify all suitable habitat for the Maguire daisy. Suitable habitat surveys need to document habitat losses, and quantify impacts from trampling and grazing.

Identify populations which will best ensure the long-term survival of the Maguire daisy. Population studies need to include age class distribution, address increases/reductions for each population, and effects of disease and parasitism, etc.

These activities will be the responsibility of the affected land managing agencies with technical assistance from the Service.

3. Conduct research on the biology of the Maguire daisy.

- 3.1 Determine the biological and ecological factors controlling the viability of the Maguire daisy. Little is known concerning the biology and ecology of the Maguire daisy including potential natural threats such as disease, parasitism, and grazing by native species. No known diseases have been reported in this species. Determining the biological and life history characteristics of Maguire daisy is needed to adequately manage the species habitat and to ensure the species continued survival and preservation of its ecosystem.
- 3.2 Establish and conduct minimum viable population studies on at least six Maguire daisy populations. Minimum viable population studies are needed to document demographic stability of the species population and to determine if the populations of Maguire daisy are at population levels that ensure long-term demographic and genetic viability. A minimum viable population is defined as: a demographically stable population that is large enough to maintain genetic variation and to enable the species to evolve and successfully respond to natural environmental variation (Menges 1986). If, as a consequence of these studies, other factors, natural or man caused, are identified as possibly having a detrimental effect on the species population which would preclude its eventual downlisting or delisting, those factors will be addressed and the recovery plan revised to accommodate them. This activity will be the responsibility of the affected land managing agencies with technical assistance from the Service.
- 3.3 Determine the horticultural requirements and establish botanical garden populations of the Maguire daisy. The introduction and maintenance of Maguire daisy in recognized botanical gardens will assist in public education of the significance and importance of this species and will provide for a reserve of seeds and plants for reintroduction into the wild, should wild populations be lost, and for the possible introduction of supplemental populations (Task 4). The Service with assistance from public and private conservation groups and land managing agencies should initiate this activity.

4. Evaluate the need for the introduction of supplemental populations into suitable habitat.

After completing exhaustive status surveys for additional Maguire daisy populations (Task 2), and biological, ecological, and horticultural research on the species (Task 3), the Service and land managing agencies will evaluate the need for the introduction of supplemental populations to ensure the species continued survivability or to facilitate its delisting.

5. **Establish formal land management designations to provide for long-term protection of Maguire daisy habitat.**

Such designations will need to be made by the Bureau of Land Management and National Park Service and may include the following: Research Natural Areas, Areas of Critical Environmental Concern, and/or designated Wilderness. Such designations should ensure the long-term protection of enough populations of the Maguire daisy to ensure its survival as a vigorous reproducing species after possible delisting.

6. **Develop public awareness, appreciation and support for the conservation of the Maguire daisy.**

Education is a vital part of the recovery process. The cooperation of the public is essential to the ultimate success of the species recovery program. Educational tools, such as pamphlets and audio-visual programs should be developed and made available for use in schools and groups interested in conservation. Establishing and maintaining the Maguire daisy in recognized botanical gardens (Task 3) will assist in public education of the species. The Service with assistance from public and private conservation groups and land managing agencies should be primarily responsible for this activity.

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III. IMPLEMENTATION SCHEDULE

The Implementation Schedule that follows outlines actions and costs for the recovery program. It is a guide for meeting the objectives elaborated under the Recovery section of this plan. This schedule indicates task priorities, task numbers, task description, duration of tasks ("ongoing" denotes a task that, once begun, should continue on an annual basis), the responsible agencies, and lastly, estimated costs. These actions, when accomplished, should bring about the recovery of Maguire daisy and protect its habitat.

Priorities in column one of the following implementation schedule are assigned as follows:

1. Priority 1--An Action that must be taken to prevent extinction of, or to prevent the species from declining irreversibly in the foreseeable future.
2. Priority 2--An action that must be taken to prevent a significant decline in species population/habitat quality or some other significant negative impact short of extinction.
3. Priority 3--All other actions necessary to meet the recovery objective.

Key to Acronyms used in Implementation schedule

BLM - Bureau of Land Management
CPC - Center for Plant Conservation
NPS - National Park Service
UT - State of Utah, including the Utah Natural Heritage Inventory
FWS - Fish and Wildlife Service
ES - Ecological Services

Erigeron Maquire (Maguire daisy) Recovery Implementation Schedule

Priority	Task	Task Description	Task Duration	Responsible Party			Cost Estimate			Comments
				FWS Region	Other Program		FY-01	FY-02	FY-03	
2	1.1	Control mineral development activities.	ongoing	6	ES	BLM				Part of ongoing agency program.
2	1.2	Control off-road vehicle use and recreational activities.	ongoing	6	ES	BLM, NPS				Part of ongoing agency program.
2	1.3	Control road building and maintenance.	ongoing	6	ES	BLM, NPS				Part of ongoing agency program.
2	1.4	Control livestock management activities.	ongoing	6	ES	BLM, NPS				Part of ongoing agency program.
2	2	Inventory suitable habitat.	3 years	6	ES	BLM, NPS, UT	3,000	3,000	3,000	
2	3.1	Conduct research on biology and ecology of the Maguire daisy.	5 years	6	ES	BLM, NPS, UT	5,000	5,000	5,000	
2	3.2	Conduct minimum viable population studies.	10 years	6	ES	BLM, NPS, UT	3,000	3,000	5,000	
3	3.3	Determine horticultural requirements and establish a garden population.	ongoing	6	ES	UT, CPC	3,000	1,000	1,000	
3	4	Evaluate need for establishment of artificial populations.	1 year	6	ES	BLM, NPS				To be determined after tasks 2, 3.1, 3.2, and 3.3 are completed.
3	5	Establish formal land management designations.	unknown	6	ES	BLM, NPS				To be determined.
3	6	Develop public education program for the conservation of the Maguire daisy.	ongoing	6	ES	BLM, UT	5,000	1,000	1,000	

This recovery plan was made available to the public for comment as required by the 1988 amendments to the Endangered Species Act of 1973. The public comment period was announced in the Federal Register (59 FR 49253) on September 27, 1994, and closed on October 27, 1994.

During the public comment period, two comment letters were received. The comments provided in these letters have been considered and incorporated as appropriate. Comments addressing recovery tasks that are the responsibility of an agency other than the Fish and Wildlife Service have been sent to that agency as required by the 1988 amendments to the Act..